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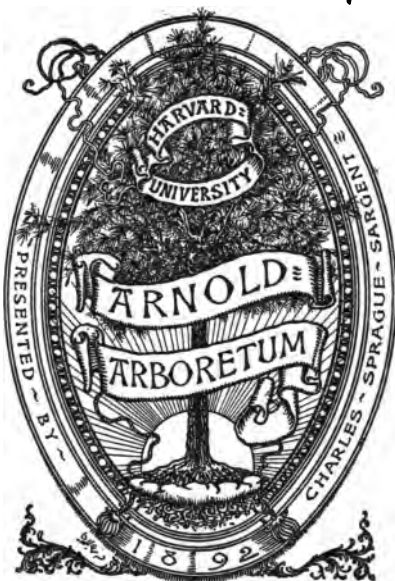
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AN ADDRESS

ON

OUR SCHOOLS AND OUR FORESTS.

BY

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CHIEF OF THE FORESTRY DIVISION, U. S. DEPARTMENT OF AGRICULTURE,

DELIVERED BEFORE THE

DEPARTMENT OF SUPERINTENDENCE OF THE NATIONAL
EDUCATIONAL ASSOCIATION

AT

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cle of commerce in regions where it was once abundant, and the effect of this upon their prices, which are constantly tending to further increase as these supplies become less.

In view of these facts let us at once proceed to inquire as to the duties of our schools in reference to our forests. This question of forest supplies has for a long period engaged the attention of governments older than ours, and we should be able to profit from their experience, applying such modifications as differences in government and circumstances may suggest in order to adapt them to our own peculiar wants.

We find in Europe that in every principal country upon the continent the woodlands belonging to the government and to local municipalities and public institutions are under the care of a special branch of administration, which not only looks after their management to prevent injury or waste, but has for its especial duty to secure the restoration of forests when cut at full maturity or at appointed times, and this by means which shall most effectually secure the greatest possible benefit that the conditions allow. This management implies the necessity of a well organized corps of agents specially educated to the duties of their profession, and for this preparation there have been established schools of forestry in every country that has a forest administration, and these schools have been provided with full appliances for rendering their operation complete. At these schools of forestry every branch of science that finds application in the cultivation and care of woodlands is taught and illustrated by excursions and practical labors in the nurseries and forests connected with the establishment. The attainments of the student are tested upon entering and at leaving, as well as at various stages of his progress, and at the end of his prescribed course he is ready to enter the forest service upon a subordinate grade, from which he may rise by successive steps to more important stations. Finally, having spent his working years in the service, he is entitled to retirement upon a pension; and, if his career has been one of especial merit, honors and distinction are awarded him.

As the course of instruction in these schools is strictly technical, the range of studies extends no further than to include the sciences that concern the forester's profession, including the legislation and jurisprudence of the forest code, the details of official business, and a knowledge of his duties in the transactions that may come before him in the various stations which he may be called upon to hold. The course varies somewhat in different countries, owing to differences in their forest laws, but it is substantially the same so far as depends upon mathematical principles and upon the natural and physical sciences that are taught.

To illustrate the range and extent of the course, we will present a list of the professorships and of the studies taught by each in the Forest Academy at Tharand, in Saxony, one of the oldest in Europe, and therefore one in which we may expect to find the fruits of long experience embodied in the course of instruction now in use.

This school was begun at Zillbach in 1786, was more formally established in 1795, was removed to Tharand in 1811, became a public institution in 1816, and from 1830 to 1870 was a school of agriculture and forestry combined. For the last ten years it has been a school of forestry only, and has an attendance of from fifty to seventy students, almost one-half of whom are foreigners attracted thither by the excellence of opportunities and ambitious to qualify themselves for the position of foresters to large estates or for employment in the forest service, now becoming more common under colonial governments. There is as yet no school of forestry in Great Britain, but much attention is now being given to the conservation of forests in India and other remote British colonies, and the agents aspiring to these appointments must resort to these special schools upon the Continent, whereof Tharand gets a considerable share.

The academy is under the ministry of finance, and its course of instruction extends through two years and a half. The student must show upon entering, besides certain qualifications as to age, means of maintenance, &c., the attainments implied in a full course of study at a Gymnasium or a Realschule, and if he aspires to the Saxon service he must have worked half a year under approved instruction in a forest.

The course is divided among ten instructors, as follows: (1) the director, who teaches the history and literature of forestry, forest regulation and improvement and police, and leads in certain excursions and practical exercises; (2) a professor of arithmetic, algebra, and geometry, and their applications to forest work and mechanics, accompanied with mathematical exercises; (3) a professor of chemistry and chemical technology, agricultural chemistry, and laboratory work; (4) a professor of physics, mineralogy, and geology, who leads excursions in the application of these studies; (5) a professor of forest cultivation, protection, and administration, hunting, and forest taxation, with practical excursions and exercises; (6) a professor of general and forestal botany and vegetable physiology and microscopy, with exercises and excursions in natural history; (7) a professor of surveying, road making, draining, the calculus, &c., with excursions in surveying and measuring; (8) a professor of general forest industries, forest finances, and an encyclopedic view of agriculture, pasturage, &c.; (9) a professor of zoölogy, and especially of entomology; and (10) a professor of law and forest jurisprudence.

There are connected with the academy a large library, an extensive and valuable cabinet, a forest garden, and a forest district in which all the practical details of regulation and management are going on and with which the student must become personally familiar.

At the French school of forestry, at Nancy, the student must learn something of military discipline and regulations, and in the Russian schools of forestry the military organization is carried still further and pervades the whole forest service.

At Eberswalde, in Prussia, one of the best of forest academies, 2,648 hours are given to instruction, extending through two years and a half, or a little less than five hours a day, of which 840 (about 32 per cent.) are given to the natural sciences, 440 (about 16 per cent.) to mathematics, 980 (about 36 per cent.) to the economical sciences, 180 (about 6 per cent.) to jurisprudence, and 340 (a little over 10 per cent.) to exercises and excursions.

The following is proximately a list of the schools of forestry now existing in Europe:

(1) *Schools of forestry alone.*—In Prussia, one at Eberswalde and one at Münden. In Saxony, one at Tharand. In Saxe-Weimar, one at Eisenach. In Austria, secondary schools at Weisswasser in Bohemia, at Eulenburg in Moravia, and at Lemberg in Galicia; lower schools at Aggsbach in Lower Austria, at Wildalpen in Styria, and at Kreutz in Croatia. In France, one at Nancy and a School of Forest Guards at Bavas. In Italy, one at Vallombrosa. In Spain, one at San Lorenzo del Escorial, near Madrid. In Russia, one at Evois, Finland. In Sweden, one at Stockholm.

(2) *Forest departments in universities and polytechnic schools.*—In Bavaria, at Munich (lately a separate forest academy at Aschaffenburg, which is still in part retained); in Hesse-Darmstadt, at Giessen; in Baden, at Carlsruhe; in Brunswick, at the Polytechnic Institution; in Switzerland, at Zürich.

(3) *Academies of agriculture and forestry.*—In Austria, at the special high school, at Vienna; in Württemberg, at Hohenheim, with a special course at the university for those aspiring to a place in the administration; in Russia, one near Moscow, one at St. Petersburg, and one at New Alexandria in Poland, with a special school of applied forest industries at Lissano; in Portugal, near Lisbon; in Denmark, at Copenhagen.

(4) *Academies of mining and forestry.*—In Austria-Hungary, one at Schemnitz. Besides these special institutions, about thirty in number, at which the profession of forestry is made a particular object of instruction, there are a multitude of others in which the importance of the subject is recognized and more or less provision is made. Thus, at three of the agricultural schools in France, an agent of the forest administration is detailed for this instruction, precisely as our own Government details officers from the Army for giving military instruction in some of our colleges. There are at least seven schools in Sweden at which a course of one year in forestry is taught, and ten years ago there were thirteen elementary schools of forestry in that country.

A few years after the Crimean war the Turkish government undertook to establish a school of forestry at Constantinople, and one has been founded recently in India, for the purpose of fitting the agents of the government for an intelligent performance of their duties.

Such being the provision made in other countries for supplying an

educational want in their public economy, of which they had felt the need and without which they would have suffered an injury, let us next consider how our circumstances compare with theirs and what are our duties in view of the prospect before us.

As for our wants: If we take into estimate the prairies and the plains, as well as the immense clearings in the older States, we shall find, probably, in the whole country, a relatively smaller percentage of woodlands available for us than that of either France or Germany, where the organization of the forest service is the oldest and most complete, and in some of our newer States and Territories relatively much less than the most poorly supplied country in Europe. It is true that our native supplies are very unequally distributed, and that in some regions they are largely in excess of the present local want. In other sections of the country the timber is at present altogether inaccessible by any existing means of transportation, and in others it is so remote that the expense of freight cannot be borne until the present market prices have greatly advanced, and it will be a sad day for those concerned in the wood industries, and for their patrons, when the time shall come that it will be necessary to bring lumber and timber from these distant points.

As already remarked at the beginning of this paper, the use and waste of forest products far exceed the growth, and this disparity is every year increasing as new demands arise for local use or new markets are opened for exportation. It is therefore among the plainest of certainties that our people must in the near future feel the inconvenience of greatly enhanced prices and among the strongest of probabilities that they will then begin to realize the profits from the growing of timbers. To do this to advantage they will need a certain kind of education that our schools do not now provide, for, although there may doubtless be hereafter a great deal of empirical planting, just as there is of farming, without the planter being able to assign a better reason for his methods than that his neighbors do likewise or that his father did so before him, it is now too late to deny, and it is quite needless to prove, that in tree planting as in every other pursuit in business the man of best education attains the greatest success.

It is within the knowledge of every one that our native forests present great diversity in their timber growth. In one locality we find the maple or the oak; in another, the ash or the elm; in another, the hemlock, or the pine, the chestnut, the cypress, or the walnut, as the prevailing kind; and this difference will always be found due to the favoring conditions of soil or of subsoil, of subjacent rock foundation, of humidity or dryness, or of elevation or aspect that suit the wants of these particular kinds. It may often happen that a species from another region or country may prove even more thrifty and profitable than any that are found growing in a native state, and in planting a prairie region where no timber has grown, at least within the period of our memories or traditions, it is of the very highest importance that these capabilities

and preferences be well understood beforehand. If we commit an error in the sowing of a farm crop the failure will not extend beyond the first year, and the farmer deserves no sympathy who will repeat his error in the next. But timber trees are at best of but slow growth, and a life-time might be lost in waiting to see the unprofitable growth of a tree ill adapted to its place, while a more intelligent choice and management would have brought a revenue to the planter. But what is our need from an educational standpoint and what is demanded of our schools in the interest of the forests? Will any of the foreign systems apply to our wants, or, if not, what modifications do we need to meet the requirements in prospect? Let us see how the circumstances differ.

In every foreign country where systems of forest management exist there are large areas of woodlands belonging to the government and to communes or other local municipalities and to public institutions.

The inhabitants of communes often enjoy rights of common usage, either in the way of fuel and building material, or in the gathering of seeds and fruits or of fresh leaves for feeding or fallen leaves for bedding their stock, or rights of pasturage, or some other privilege which has been secured to them by statute or confirmed by customs stronger than law. The management of common rights presents some of the most difficult problems with which the European forester has to deal. It forms a branch of special instruction in the schools of forestry, and it often becomes so serious a bar to improvement that these privileges must be bought off, commuted, or exchanged for some equivalent benefit before a reform can be secured.

In many European forests certain kinds of game are reserved for the enjoyment of a privileged class, and their care and protection come within the forester's duties and form a part of his education, even where their presence works an injury to the growth of the timber he is bound to cherish and proves a scourge to the neighboring farmer, who is forbidden under heavy penalties to injure the animals that may be destroying his crops and, it may be, further forbidden to fence his fields if it should hinder pursuit by those who may join in the chase.

In some instances the government in former times reserved the first choice of timber for its navy, and might even take what it needed where most convenient, not sparing the lawn tree or the avenue planted by ancestors, if the caprice or the convenience of officials so decided, and there are still some rights of preference and some restraints upon private usage that may prove burdensome to the landholder. Finally, there are tenures and limitations upon the title to lands that may embarrass or wholly prevent an industry that brings only a remote benefit; as no tenant would ever plant a tree that could only be cut after his lease had expired or make any other improvement that he could never enjoy. Now, our circumstances as regards the ownership and tenure of the land are as follows:

The National Government has indeed some valuable tracts of timber

land which it should lose no time in putting under a management tending to secure the greatest benefit to the present and the future; but our States own no land (except as granted for special objects) and it has hitherto been the policy of both the general and the State governments to transfer their lands to the actual settlers as soon as possible. In fact, all the land in the older States and much of it in the newer States and Territories has already become private property under titles that are absolute and unconditional. Fortunately we have no rights of common usage in our woodlands, no rights of preference in their timber, no privileged classes having rights of chase upon the lands of vassals, no game but such as the owner of the land may choose to own or allow, and no hunting but such as he may permit or forbid. Our schools will therefore never have occasion to teach a forest code or the jurisprudence that may arise under it. They need pay no attention to game except as the state may enact laws for its protection in the interest of agriculture or for other common benefit; and until a time shall come when our forests reserved for the supply of the timber market are owned by great corporations, having the stability and capital that give assurance of permanence, there will be no great opportunities for applying plans of *aménagement*¹ that shall govern the future working of a young forest upon a private estate, until it comes to full maturity, for the use of generations unborn.

The graduate of a European school of forestry would scarcely find use for the education he had acquired beyond his training in the physical and natural sciences and in mathematics were he placed in the most responsible trust that our forest owners could offer; but in these branches the general principles are alike the world over, however codes may vary, and his success with us, as elsewhere, would be in direct proportion as he had learned to apply these principles to the conditions he might find and to appreciate the modifications in management that new circumstances might require.

The education that our country requires in the interest of forestry (and which, from present prospects, our schools will ere long be called upon to supply) will not, in our opinion, be so much of a thorough and exhaustive kind for the special benefit of a few as of a more general and elementary character that shall come within the reach of many. We need first and most of all, not simply in our schools, but throughout our whole country and especially among the rural and agricultural classes, the diffusion of the simplest principles of political economy that teach the importance of our woodlands to the general welfare and the need of the material that they furnish for the supply of our indispensable wants in life—a due appreciation of the incidental benefits which our woodlands secure to agriculture and to the sanitary and industrial interests that depend upon an adequate and duly equalized water supply.

¹ Technically used in France for the legally regulated cutting of forests.

These utilitarian ideas are not in the least degree inconsistent with a due appreciation of the beauties of woodland scenery and the full enjoyment of all that is lovely in rural landscapes and forest shade. The forester looks with pride and pleasure upon the tree or the grove that his hand has planted, and as he watches its growth from year to year he cannot fail to acquire an attachment for the scenes and solitudes of a woodland life.

To realize how much of the imagery of the poets and of beauty in landscape painting depends upon sylvan scenery and rural associations, we need but imagine how blank and dreary would poetry and painting be without them. Whatever tends to cultivate and extend this appreciation of the beautiful in nature is so far in direct advancement of forestry, and it may be proper to here consider some of the means by which this may be done. We know in every phase of life, in every pursuit of business or of pleasure, in every usage of society, how much mankind are influenced by the example of others. In some things we call this tendency to imitation a fashion and in others a custom, and in neither case can any better reason be assigned for the imitation than that it is the practice of others.

We have an interesting example of a widespread and lasting custom of tree planting in English history. There is at present no country in the world where there is such an abundance of trees planted for ornament as in England. The well kept parks and landscape views presented upon the estates of the nobility and the landed gentry are the pride of their owners and the admiration of travellers. This taste for rural ornament is largely due to the efforts of Sir John Evelyn more than two hundred years ago. This writer was an especial favorite at the court of Charles the Second and, as remarked by a subsequent editor of his writings, "from an early entrance into public life to an extreme old age he considered himself as living only for the benefit of mankind." His best known work, entitled "*Sylva: A Discourse of Forest Trees*," acquired great popularity, as shown from the large and frequent editions that appeared during the author's life, and the permanence of this interest is further proved by the many later editions which have since been issued, almost down to the present time. Under the impulse and advice of Evelyn, the king and the nobility of that day began extensive improvements in planting their estates, and the example thus set became a widespread fashion among landed proprietors throughout the kingdom, which has continued down to the present time. We have evidence of this immediate and effectual impression made by the writings of Evelyn in a dedication to Charles II prefixed to one of the later editions that appeared during the author's life, in which he says: "I need not acquaint Your Majesty how many millions of timber trees, besides infinite others, have been planted and propagated throughout your vast domains at the instigation and by the sole direction of this work, because Your Majesty has been pleased to own it publicly for my

encouragement;"¹ and no more striking or beautiful tribute could be paid by a man of genius to one who had worked so lovingly for the good of his fellow man than was that by the elder Disraeli in his *Curiosities of Literature*, in which he says: "And surely while Britain retains her awful situation among the nations of Europe, the Sylva of Evelyn will endure with her triumphant oaks. It was a retired philosopher who aroused the genius of a nation, and who, casting a prophetic eye towards the age in which we live, contributed to secure our sovereignty of the seas. The present navy of Great Britain has been constructed with the oaks which the genius of Evelyn planted." There is something, indeed, in a noble park that betokens stability and opulence in the owner, and there can be nothing more flattering to family pride than to point out a grand avenue of majestic trees that an ancestor planted. We need not travel far nor seek long for illustrations of this feeling in our own country, for a man can scarcely plant a tree upon his homestead lawn without ever afterwards looking upon its growth in size and beauty with satisfaction. If an accident happens to it he willingly spends much more than its simple value, if within the possibility of remedy; or if maliciously injured he will resent it as if it were a personal injury.

It has sometimes been a custom to plant a tree to commemorate an event. It may record the nativity of a child in a family, or the visit of an illustrious guest, or some memorable event in history. Thus in the ancient Dutch city of Albany there are now great trees in the streets coeval with a present or a former inmate of the dwelling opposite and an aged elm that was planted to commemorate the arrival of General Burgoyne as a prisoner of war soon after the surrender of Saratoga. Throughout the length and breadth of our country we have trees planted during the Centennial year; and whenever a historical event is connected with a tree the tree becomes ever after an object of interest while it lives. The Royal Oaks that sheltered Charles the Second, the Charter Oak of Hartford, and the Treaty Tree in Philadelphia were monuments while they lasted and were cherished as relics when they fell. Of similar but more local interest are the class trees on our college grounds and the trees planted on special occasions to commemorate interesting local events.

The promotion of a taste for rural adornment and ornamental planting being an object worthy of our earnest effort, as well from the æsthetic culture and refined enjoyment they secure as from the favorable influence that they exert upon plantations for utility, let us inquire as to the means by which this object of manifold advantages may be best secured.

In our cities and large towns public parks are now very generally recognized as important agencies for the hygienic welfare and personal enjoyment of their inhabitants. The responsibility as to their manage-

¹ Disraeli's *Curiosities of Literature*, vol. II, p. 326 (New York, 1871).

ment is naturally vested in the municipal government, and should be in charge of a special commission, upon whose intelligence and efficiency their success depends. The influence of public parks upon the general welfare should be more fully appreciated, and there are many cities of large and dense population where these improvements have not yet begun. In others, where a beginning has already been made, the need and opportunity of a barren waste, a river bank, a shore, an island, or a point of land within or adjacent to the city limits has not yet been noticed, where a moderate expense might secure a little paradise of beauty and an inviting place of rest. The grounds around public institutions, in rural cemeteries and the like, might often be made more agreeable to the eye if the opportunity for improvement were pointed out and sufficient means allowed. The interest in city parks might often be greatly increased by greater variety of species and by correct labels of their names.

In villages we find greater opportunities for individual action and abundant advantages from a concert of effort which it is the special province of village improvement societies to secure. I am well aware that others present have given much attention to this class of associations, in which the efforts are sometimes not limited to the material welfare of their localities but extend to intellectual improvement and refinement in social life. They deserve our highest commendation and support, and the educational bearings of these efforts are too obvious to require special notice.

The example of one village becomes the pattern of another; and should emulation arise between neighboring villages, we would not have it checked until each has outdone the other in rural adornment.

From large villages the example tends to imitation in the smaller ones, where, although the means may be less, the opportunities of space may be relatively greater, and from these to private homesteads throughout the land. Although the intellectual and social refinement arising from these customs deserves first mention among their advantages, we may notice that they tend to enhance the value of the property that they adorn. They render a village more desirable for residence and invite the notice of those who, having earned a competence in the cities, are seeking to retire to the quiet shades of rural life, that still present attractions for intellectual enjoyment and the amenities of a refined neighborhood. The farmer who would wish to enhance the market value of his land could not invest more profitably than in trees; and it will be fortunate if he early learns the useful fact that there are corners and waste places in abundance, now unproductive and unfit for other cultivation, that present the most favorable conditions for the growth of forest trees.

The man who has cleared a farm out of the forest seldom or never plants a tree. He has come, from long custom, to look upon trees as an incumbrance to be removed; and whenever his home presents a

noticeable amount of sylvan shade it is more likely to be the work of a younger generation, who have no sympathy with his aversion and a better idea of the comforts of home life. Americans have been reproached for having but slight attachment to the homes of their childhood; and this willingness to sell to a stranger the land that a parent has cleared and cultivated, and on which their own early years have been spent, has been ascribed to a certain instability of character and an uneasy desire for change.

There is doubtless a strong affinity between a love of home and of country, and it is true that an attachment to a homestead because of ancestral possession and family associations would greatly tend to increase our national prosperity and happiness. It would lead to substantial investments for permanence and future enjoyment that the transient and speculative owner would never make, and it would tend to the more solid foundation of our public institutions generally. The man who settles temporarily for business and expects to depart when he becomes rich, spends no money upon public libraries and cares nothing for the charitable and educational establishments of the place, provided they do not burden him while he remains. His influence will generally be adverse if these objects require expenses that bring no return during his stay, and he will prefer temporary expedients to permanent investments if they but serve to bridge over the time of his sojourn. The solid and substantial foundation of our institutions is laid by those having a permanent interest in the prosperity of the places where they are located. It is this class alone that erects monuments and that leaves evidences that its members have lived for the welfare of those who are to come after them.

It is a point worthy of inquiry as to whether much of this indifference to the home of childhood and to the possessions of ancestors with which Americans have been charged is not due to their bleak and cheerless surroundings.

We cannot doubt that the influence of a pleasant rural homestead and the choice memories of refined associations in early youth are as capable of making as strong an impression upon our native population as in any country whatever, and although in the absence of laws of entail and under the impulse of adventure or motives of interest or the force of circumstances a change of ownership may often happen and the choice and cherished homestead become the property of a stranger, still the chances become less as the attractions are greater, and a motive worthy of earnest and honorable effort is presented in favor of maintenance in the family line.

From this form of education by example, tending to promote a taste for rural planting and the enjoyment of rural scenery, which cannot fail to promote a more general plantation for utility, let us next consider the direct educational appliances that should be supplied in our institutions of learning.

Commencing with our colleges, we almost uniformly find, except in large cities, that they have sufficient land around them to justify a certain amount of planting and often facilities for a first class arboretum. Instead of the plantation of one or a few species, it would be better to group together, in their natural relations, as great a variety of species as the soil and climate would favor—thus affording a ready illustration for comparative study and the means for becoming practically familiar with the characteristic features of each. Of course each species should be correctly labelled with the scientific as well as the popular name and it would be still better if the synonymes and the names in the more important foreign languages could be known. This object lesson would still be but imperfectly learned unless the student were required to know the leading facts concerning the native region, geographical range, uses, and best methods of propagation of each species under observation; and he should be able to point out the characteristic features of each. Our agricultural colleges should be required and the best endowed of our colleges should be induced to establish nurseries for the propagation of trees and for experimental study, and cabinets of wood specimens and wood products, with illustrations of the foliage, the fruit, &c., should be provided.

In teaching the sciences of geology, chemistry, botany, zoölogy in its various branches, and climatology, their relations to forestry should be clearly defined and their application shown. We have already noticed the prominence that is given in European schools of forestry to practical exercises and excursions under the guidance of teachers, with the view of rendering the student thoroughly familiar with the subject of his studies and qualified to judge and act intelligently when thrown upon his own resources in after life. There can be nothing more rational or effectual in education than this, and in nothing in the whole plan of our system of education has there hitherto been so much neglect. No person should deem himself qualified to teach a science that he cannot illustrate in its applications as they appear in nature or are employed in the industries; and we would most earnestly commend this point to your thoughtful consideration as a deficiency in our system of education that should be supplied. We are aware that chemistry, engineering, and to some extent the natural sciences are thus practically taught, but we would have the method extended to far greater degree than has yet been attempted. Finally, our college classes, before graduation, should enjoy the privilege of some instruction, if only in a course of a dozen lectures, in which the general subject of forestry should be presented. These lectures might include a brief historical outline of the subject; a notice of the codes of administration in various foreign countries; their methods of management in the ordinary course of forest culture and under exceptionally difficult conditions, as for example upon mountains eroded by torrents or upon drifting sands; the various modes of extraction and transportation; forest police; the prevention and control

of fires; the means employed for limiting insect ravages and other injuries; the usages of commerce; the economies that apply, and the question of supply and demand.

In this outline of what might be taught in our colleges, excepting the labelled collections of living trees and cabinets and excepting the special lectures upon forestry, I have suggested nothing but what our existing organizations ought to be able to supply, and this without materially adding to the duties already assigned. The application might require some preparation on the part of instructors to familiarize themselves with these duties and some modification in our text books, or, what would be better, a manual specially adapted to this subject that does not as yet exist in our language, but which could be readily supplied.

Descending from our colleges to the academies, a modified form of the course above sketched might be conveniently applied. The labelled plantations of living trees and the cabinets would still find an appropriate place, and in the studies above enumerated, to the extent that they are taught, the applications to forestry might, with equal advantage, be made practically familiar from fresh specimens in the classroom and by occasional excursions in the groves. There is no more profitable mode for cultivating a habit of observation than by requiring the student to discover and describe the differences that exist between objects that have a general resemblance but which are still unlike. For example, if branches from two species of the maple or the birch, the oak or the walnut, were assigned as a study, the mental effort involved in the exercise would lead the close observer to notice differences in the leaves, the buds, the bark, and the wood that he had never recognized before, however familiar these objects may have been, and the habit of close observation thus called into exercise may prove of infinite service through after life. The formation of private collections in forest botany and forest products might often be encouraged among the students of our academies to great advantage, requiring them at the same time to learn by their own inquiry and research, from whatever source of information they can devise, as much as may be concerning their properties, their value, and their uses. A relish for rural adornment can be in no way so effectually inspired as by example, and if some leisure hours are spent in planting and cultivating trees the knowledge may prove of great service in after life.

From the academies we pass to our public schools, where the extent of instruction must be modified to suit the more elementary course of studies that are taught. In the great cities the opportunities are few, and perhaps little can be done beyond familiarizing the scholar with the subject by cabinet specimens, engraved illustrations, and such instruction as may be incidentally given in the text books used; but in the rural districts the earnest and faithful teacher has abundant opportunities for inspiring a love of nature and of natural scenery, and there

should be no school-house without its little plantation around it, which the inmates are taught to cherish and protect. The pupils may be encouraged to undertake the cultivation of ornamental shrubs rather as a privilege than as an obligation, and many impressions alike pleasant and profitable may be planted in the scholar's mind, that, like seed in good soil, may perchance germinate and bear fruit in after years.

As an illustration of the means by which the common schools may be made the agency of imparting correct ideas upon an important subject in rural economy, I will mention the measures adopted in recent years by the French government for the protection of insectivorous birds through the agency of their schools. Wishing to learn how this was done, I applied, some time since, to M. Waddington, then minister of education, who sent with his reply a series of circulars and documents having reference to the subject before us. In his instructions to the prefects of departments, after noticing the injuries caused to agriculture by noxious insects, which have increased to a truly alarming extent in recent years, he says:

The ministers of agriculture and of the interior have called my attention to these sad conditions, of which the principal cause is the disappearance or at least great reduction in the number of insectivorous birds. These birds are the natural guardians of our harvests and the most precious auxiliaries of the farmer; yet they are everywhere treated as enemies. The cultivator, forgetting the constant services that they render him, sees only the little faults they commit; children pursue them to destruction; they are caught in nets; their nests are broken up; and these useful friends which strangers come to buy for acclimation in foreign lands are gradually disappearing from our fields. Various circulars already have been addressed to the inspectors of academies and numerous notes inserted in the official bulletins of the ministry with a view to stopping this destruction. Notwithstanding this, I deem it my duty to respond to the wishes of my colleagues by calling anew upon the teachers for their concurrence.

I therefore desire you, M. le Préfet, to address instructions to all the teachers of your department, that they take pains to teach their pupils how to distinguish the insects that are injurious from those that are useful to agriculture; and that they encourage them to destroy the former and protect the latter. It is also of first importance that children should be made to understand that it is to the interest of their families that they destroy no birds' nests, and that in doing so they show themselves both reckless and ungrateful. They should also know the penalties of law that they incur by so doing. [The statutes and ordinances forbidding this practice are here cited.]

Teachers should also remind parents of the responsibilities incurred by allowing their children to destroy birds' nests, and that they are themselves liable to a fine for the acts of their minor children in allowing them to commit this act. I will add that in some communes that could be named teachers have conceived the happy thought of organizing among their pupils little societies for the protection of useful animals. These have done good service, and it would give me great pleasure to see their number increased. I attach, sir, the most serious importance to the execution of this circular, the receipt of which you are requested to acknowledge.

Among the other circulars were lists of birds and animals most useful to the farm and garden; statements of prosecutions under the game laws that had been carried to full punishment; examples of the benefits from the abundance of birds and of injuries from their scarcity, and pathetic stories to be read by the children that might well tend to enlist

their sympathies in behalf of these feathered allies of the field. The following may be taken as an example of the class of stories thus brought under their notice :

A sportsman was returning from an unsuccessful tramp, when a little bird accidentally crossed his path. With scarce a motive, for it was not a game bird, he discharged his gun, wounding the little creature, which fluttered slowly away. Curiosity led him to follow the trail till it led to the nest where the mother bird was found in a dying condition, and trying to protect its young that were covered with its blood. The thoughtless cruelty of his act so impressed the hunter that he resolved from that moment that he would never kill another bird.

It may be thought that I am wandering from my subject in passing from trees to birds. But really, can we speak of rural scenery and sylvan life without associating them together ? In fact, this very subject of the protection of insectivorous birds for the benefit of agriculture presents a strong argument in favor of planting groves and belts of timber between our fields to afford a nesting place and a shelter for them ; and the measure we have seen introduced in France from motives of public economy deserves attention in our own rural districts as much as in any other part of the world.

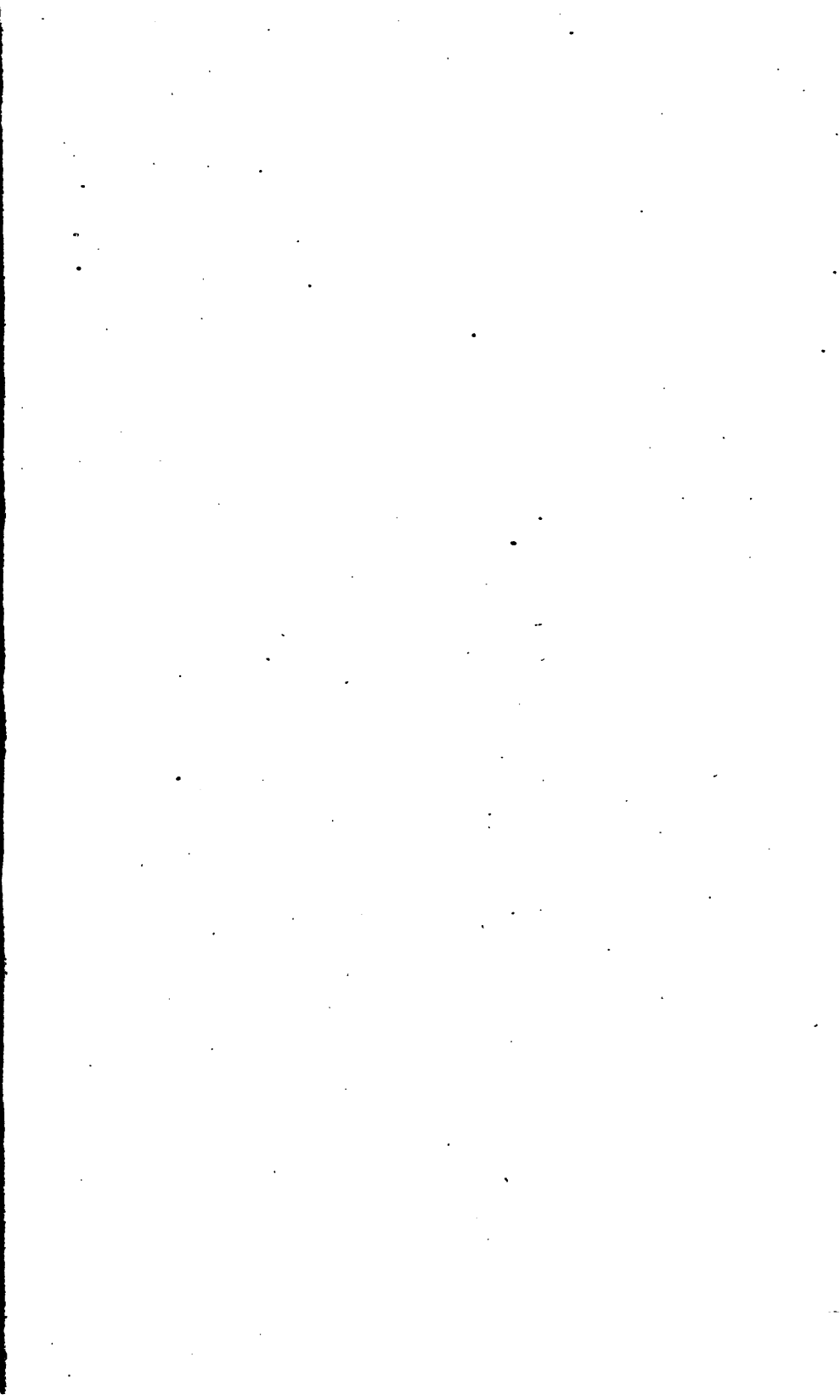
In speaking of what might be done in favor of rural adornment, and incidentally of planting, through the instruction of our schools, it will at once occur to us that our teachers should themselves be taught ; and hence we come to another phase of education that concerns our normal schools. We cannot here expect to do more than impart some general ideas on the subject ; but there should at least be provided half a dozen lectures before each graduating class, and something, if no more than a single lecture, should be given at our annual teachers' institutes upon this most important subject.

In conclusion, we would remark that in this question of forest supplies and the incidental benefits of woodlands, now beginning to excite attention, we start with the disadvantage of having to encounter the prejudices of those who have been accustomed to look upon our woodlands, if not too abundant, at least as infinite in amount and in duration. We must undeceive the overconfident, convince the doubtful, and awaken an interest in the indifferent.

If we may borrow from the experience of our clergy, who generally find old sinners hard subjects for conversion, our greatest hope depends upon the impressions that may be made upon the young. This class we find in our schools, and we have the best of opportunities for inspiring in them a love of the beautiful, as well as of the useful, in the life that is opening before them. Although this association of the pleasant and the profitable should be a leading object in every phase of education, we may give prominence to the former without injury to the latter, and feel assured that, when a fondness for any study or pursuit is once established under pleasant and attractive associations, the uses will be discovered, although they may not have been directly pointed out.

If we can induce the young man to plant a grove of trees for the charming contrast of light and shade that it will afford when grown, he will in due time discover, without being told by us, the market value of the timber in the trees that cast these shadows. The planter of a woodland of oaks and pines may enjoy their growth through a lifetime, and his children after him, until they become grand and majestic, yet this will not prevent us from figuring on their value for staves and shingles when they come to maturity and should give place to a new growth. 'Tis true the love of gain is low and sordid as compared with the more refined and honorable motives of life, and we should appeal to this only when the one you would influence will listen to no other. If by means of the latter we can secure the enjoyment that they afford, and at the same time assure the advantages of the former, we shall have reached the highest point to which our education can attain.







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